

CLAIMS

What is claimed is:

1. A system for monitoring the operation of an HVAC system comprising:
 - air conditioning system component;
 - a sensor attached to the air conditioning system component to monitor an operating condition of the component;
 - a remote monitoring unit that receives a signal from the sensor indicative of the operating condition of the component located at a site of the HVAC system;
 - a remote monitoring device located at a site remote from the location of the HVAC system in communication with the remote monitoring unit, the communication initiated by the remote monitoring unit when the sensed operating condition of the component is within a critical parameter range, causing the remote monitoring unit to generate an alarm;
 - whereby the remote monitoring device initiates remedial action in response to the alarm.
2. The system of claim 1 wherein the remote monitoring unit includes means for storing the signal indicative of the operating condition of the component.
3. The system of claim 2 wherein the communication between the remote monitoring unit and the remote monitoring device further includes the remote monitoring unit providing information about the monitored component to the remote monitoring device.
4. The system of claim 3 wherein the information provided includes component identification information.
5. The system of claim 3 wherein the information provided includes operating condition information stored in the means for storing.

6. The system of claim 3 wherein the information provided includes a real-time signal from the sensor.
7. The system of claim 3 wherein the remedial action includes notifying a service technician to implement corrective action and initiate any required repairs.
8. The system of claim 3 wherein the remedial action includes providing the information to a manufacturer of the HVAC system, wherein the HVAC system manufacturer can evaluate the information and initiate additional corrective action following evaluation.
9. The system of claim 1 wherein the air conditioning system component is a chiller assembly.
10. The system of claim 9 wherein the chiller assembly further includes a control panel in communication with the sensor to receive signals from the sensor.
11. The system of claim 10 further including a microgateway which receives signals from the sensor and provides the signal to the remote monitoring unit.
12. The system of claim 11 wherein the microgateway is connected to the control panel of the chiller assembly, receiving information from the sensors available at the control panel, and wherein the microgateway is in one way communication with the remote monitoring unit, providing the received information to the remote monitoring unit.
13. The system of claim 1 wherein the air conditioning system component is a rooftop unit.
14. The system of claim 13 further including a monitor control interface unit in communication with the sensor and receives signals from the sensor indicative of the operating condition of the component.
15. The system of claim 14 wherein the monitor control interface unit is in one way communication with the remote monitoring unit and provides

the received signals from the sensor indicative of the operating condition of the component to the remote monitoring unit.

16. The system of claim 2 wherein the remote monitoring unit is a programmable device.

17. The system of claim 16 wherein the programmable device is a computer.

18. The system of claim 16 wherein the remote monitoring unit includes software that evaluates the signals from the sensor and includes logic to determine when the signals indicate that the operating condition of the component is outside of normal operating parameters but not within a critical parameter range.

19. The system of claim 18 wherein the logic further determines when the signals indicate that the operating conditions of the component are outside the normal operating parameters for greater than a preselected time period, thereby generating a warning alarm.

20. A system for monitoring the operation of an HVAC system comprising:

air conditioning system component;

a sensor attached to the air conditioning system component to monitor an operating condition of the component;

a remote monitoring unit that receives a signal from the sensor indicative of the operating condition of the component located at a site of the HVAC system, the remote monitoring unit capable of establishing a line of communication, the remote monitoring unit including means for storing the signals indicative of the operating condition of the component, diagnostics to evaluate the signals indicative of the operating condition of the component to determine whether the operating condition is within normal operational parameters, and means for generating an alarm when the operating condition is outside of normal operational parameters;

a remote monitoring device located at a site remote from the location of the HVAC system in communication with the remote monitoring unit, the communication initiated by the remote monitoring unit when the sensed operating condition of the component is within a critical parameter range, causing the remote monitoring unit to generate an alarm, the remote monitoring device in one-way communication with the remote monitoring unit, the remote monitoring device capable of receiving information from the remote monitoring unit over the line of communication indicative of the history and the operating condition of the component;

whereby the remote monitoring unit establishes a line of communication with the remote monitoring device when an alarm is generated; and

whereby the remote monitoring device initiates remedial action in response to the alarm.

21. The system of claim 20 wherein the component is a chiller assembly.
22. The system of claim 21 wherein the chiller assembly further includes a control panel in communication with the sensor to receive signals from the sensor.
23. The system of claim 22 further including a microgateway which receives signals from the sensor and provides the signal to the remote monitoring unit.
24. The system of claim 23 wherein the microgateway is connected to the control panel of the chiller assembly, receiving information from the sensor available at the control panel, and wherein the microgateway is in one way communication with the remote monitoring unit, providing the received information to the remote monitoring unit.
25. The system of claim 20 wherein the air conditioning system component is a rooftop unit.

26. The system of claim 25 further including a monitor control interface unit in communication with the sensor and receives signals from the sensor indicative of the operating condition of the component.
27. The system of claim 26 wherein the monitor control interface unit is in one way communication with the remote monitoring unit and provides the received signals from the sensor indicative of the operating condition of the component to the remote monitoring unit.
28. The system of claim 20 wherein the remote monitoring unit is a computer.
29. The system of claim 28 wherein the means for storing is an electronic memory.
30. The system of claim 28 wherein the means for storing is a disk drive.
31. The system of claim 20 wherein the remote monitoring device includes means to signal the remote monitoring unit to establish the line of communication to download information stored in the means for storing.
32. A method for monitoring the operation of an HVAC system comprising the steps of:
 - providing an air conditioning system component;
 - attaching a sensor to the air conditioning component to monitor an operating condition of the component;
 - providing a remote monitoring unit, the remote monitoring unit equipped with diagnostic software and with memory;
 - sending a signal from the sensor indicative of an operating condition of the component to the remote monitoring unit, the remote monitoring unit diagnostic software determining whether the operating condition is within normal operating parameters;
 - storing information indicative of the signal in the memory;
 - providing a remote monitoring device, the remote monitoring device located at a site remote from the location of the HVAC system;

generating an alarm when the operating condition of the component is outside of normal operating conditions;

establishing a one-way line of communication from the remote monitoring unit to the remote monitoring device when an alarm is generated;

providing information indicative of the operating condition of the component to the remote monitoring device when the line of communication is established; and

initiating remedial action by the remote monitoring device to correct the condition causing the generation of the alarm.

33. The method of claim 32 wherein the information provided over the line of communication includes information indicative of real time operating conditions of the component.

34. The method of claim 32 wherein the information provided over the line of communication includes information stored in the memory.

35. The method of claim 32 wherein the step of providing the air conditioning system component includes providing a chiller assembly that includes a control panel, which received signals from the sensors.

36. The method of claim 35 further including a step of providing a microgateway connected between the control panel and the remote monitoring unit, the microgateway in one-way communication with the control panel and the remote monitoring unit so as to provide information indicative of the sensor signal from the control panel through the microgateway to the remote monitoring unit.

37. The method of claim 32 wherein the step of providing the air conditioning system component includes providing a rooftop unit.

38. The method of claim 35 further including a step of providing a monitor control interface unit in communication with the sensor which receives signals from the sensor indicative of the operating condition of the component, the monitor control interface unit connected to the remote

monitoring unit and in one way communication with the remote monitoring unit so as to provide information indicative of the sensor signal to the remote monitoring unit.